

Patent Application  
ATM-515 (7486)**REMARKS****Request for Two-Month Extension of Time Under 36 C.F.R. §1.136(a)**

Applicants hereby request a two months extension of time under 37 C.F.R. 1.136(a), thus extending the time for responding to the April 6, 2004 Office Action to September 6, 2004.

The Office is hereby authorized to charge the fee of \$420.00 for such extension request to Deposit Account No. 50-0860 of Advanced Technology Materials, Inc., 7 Commerce Drive, Danbury, CT 06810.

**Response to the Finalized §103 Rejection of Claims 1-7 and 9-21**

In the April 6, 2004 Office Action, the Examiner finalized the rejections of claims 1-7 and 9-21 under 35 U.S.C. §103(a) as being unpatentable over McEntee U.S. Patent No. 4,127,598 (hereinafter "McEntee") or Tsukuno et al. U.S. Patent No. 5,312,947 (hereinafter "Tsukuno").

In response, Applicants have hereby cancelled claim 20 and amended claims 1-4, 9-19, and 21.

Based on such claim amendments, Applicants respectfully traverse the Examiner's claim rejections, for the following reasons:

The amended claim 1, from which all the remaining claims 2-7, 9-19, and 21 depend, now recites:

**"A process for improving delivery reproducibility of a cyclosiloxane precursor to a chemical vapor deposition reactor, comprising the steps of:**

- (a) providing a cyclosiloxane precursor;**
  - (b) treating said cyclosiloxane precursor, by reducing the concentration of water and optionally at least one impurity from said cyclosiloxane precursor to produce a purified cyclosiloxane precursor having less than < 0.001% of water and optionally less than < 0.001% of the at least one impurity;**
  - (c) vaporizing said purified cyclosiloxane precursor; and**
  - (d) delivering vapor of said purified cyclosiloxane precursor to said chemical vapor deposition reactor,**
- wherein treatment of the cyclosiloxane precursor functions to prevent or minimize premature polymerization of said cyclosiloxane precursor in the chemical vapor deposition reactor and associated delivery lines."**

The instant specification on page 3, second full paragraph, describes a problem that was commonly

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encountered in the field of chemical vapor deposition (CVD) of low-dielectric constant SiCOH films prior to Applicants' invention – the cyclosiloxane precursors cannot be reproducibly delivered to the deposition substrate, due to premature polymerization of such cyclosiloxane precursors within the delivery lines and process hardware before reaching the deposition substrate.

The inventors of the present invention have recognized through studies that the premature polymerization of the cyclosiloxane precursors is caused by the presence of trace amounts of water/moisture, Lewis acids and Lewis bases (see instant specification, page 3, lines 16-18; and page 8, third paragraph).

Based on such recognition of the source of the cyclosiloxane premature polymerization problem, the inventors of the present invention provide a solution for such problem – treating such cyclosiloxane precursors to reduce the levels of water therein prior to CVD, so as to prevent or minimize the premature polymerization of such cyclosiloxane precursors (see instant specification, page 3, lines 33-34; page 4, lines 1-18).

It has been well established that the unobvious aspect of an invention may reside in the recognition of the source of a problem, and in such case, the inquiry should be directed, in part at least, to “the question of whether or not such a recognition would have been obvious to one of ordinary skill in the art.” See *In re Roberts and Burch*, 176 USPQ 313, 314 (CCPA 1973), citing *In re Conover*, 134 USPQ 238 (CCPA 1962).

Further, the Court has expressly held in *In re Spinnoble*, 160 USPQ 237, 243 (CCPA 1969), that:

“a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the ‘subject matter as a whole’ which should always be considered in determining the obviousness of an invention under 35 U.S.C. 103” (emphasis added).

In the present case, an important and unobvious aspect of the Applicants' invention resides in the discovery or recognition of the source of the cyclosiloxane premature polymerization problem occurred during a CVD process (i.e., the presence of trace amount of water, basic and/or acidic impurities in the cyclosiloxane precursors, causing the catalytic polymerization thereof). Therefore, the inquiry of obviousness must be directed to the question of whether or not such a recognition would have

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been obvious to one of ordinary skill in the art prior to Applicants' invention, without the benefit of hindsight of Applicants' own disclosure in the instant specification.

However, none of the references cited by the Examiner even contemplates the premature polymerization problem associated with chemical vapor deposition of cyclosiloxane precursors, much less than recognizing the presence of water, basic and/or acidic impurities therein as the source of such premature polymerization problem.

Therefore, Applicants' claimed invention as recited in amended claims 1-7, 9-19, and 21 of the present application patentably distinguishes over all the cited references, by recognizing the presence of water, basic and/or acidic impurities in the cyclosiloxane precursors as the source of the cyclosiloxane premature polymerization problem occurring during CVD processes and by correspondingly providing a solution (i.e., water removal) for preventing or minimizing premature polymerization based on such recognition.

#### CONCLUSION

Based on the foregoing, pending claims 1-7, 9-19, and 21 as amended/cancelled herein are in form and condition for allowance. The Examiner therefore is respectfully requested to issue a Notice of Allowance.

The Office is hereby authorized to charge any additional fees determined to be properly payable for entry of this Response, to Deposit Account 50-0860 of Advanced Technology Materials, Inc.

If any issues remain outstanding, incident to the formal allowance of the application, the Examiner is requested to contact the undersigned attorney at (203) 739-1435 to discuss same, in order that this application may be allowed and passed to issue at an early date.

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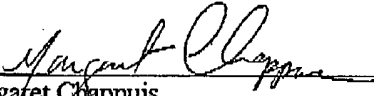
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Respectfully submitted,

  
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